AGRICULTURAL EXTENSION SERVICE
UNIVERSITY OF MINNESOTA



**DAIRY HUSBANDRY FACT SHEET**
**No. 24 — 1983**
**JEFFREY K. RENEAU**

# Prevention of Dry Period Mastitis

Proper management of the dry cow is critical to effective mastitis control. There is a several-fold increase in new infections during the period immediately following dry off and immediately preceding freshening. This relationship is illustrated in figure 1.

## CONSEQUENCES OF INFECTIONS DURING THE DRY PERIOD

Pennsylvania and English studies have indicated that 40 to 50 percent of all new infections occur during the dry period. About 40 percent of the new infections occurring during the dry period cure spontaneously. The remaining 60 percent persist as clinical or subclinical cases into the lactation, resulting in lowered milk production. Spontaneous cure occurs more frequently when the new infection occurs early in the dry period rather than when the cow is bagging up. Therefore, new infections that occur at the end of the dry period tend to have a more serious effect on subsequent milk production than do those that occur early. This relationship has been demonstrated nicely in English research (see table 1).

**Table 1. Effect of dry period intramammary infections on milk production***

| Time infection occurred | | Decreases in milk production (%) |
|---|---|---|
| Near dry off | Prior to calving | |
| Infected | Clean | 11.3 |
| Infected | Infected | 33.2 |
| Clean | Infected | 36.6 |

* A. Smith, F. H. Dodd, and F. K. Neave, *Journal of Dairy Research*, 35:287-290, 1968

Early lactation mastitis, whether clinical or subclinical, will reduce peak production. Peak production is important if maximum yield per lactation is to be achieved. Estimates are that for each pound of milk not achieved at peak production, there will be a 200-pound loss for the lactation.

## CHANGES OCCURRING IN THE UDDER DURING THE DRY PERIOD

An understanding of the changes that occur in the mammary gland during the dry period may be helpful in better understanding how mastitis can be prevented.

At dry off, there is an increase in intramammary pressure. The increased pressure stops milk secretion. This process results in disintegration of the mammary cells, eventually leading to udder collapse.

Increased intramammary pressure also causes a shortening of the teat, resulting in a more opened teat canal. This allows easier entry of bacteria through the teat canal into the udder. In addition, the cow's natural immune system is impaired because of the presence of milk fats, proteins, and the byproducts of the degenerating mammary tissue. White blood cells (somatic cells) are unable to efficiently destroy and remove bacteria from the mammary gland under these conditions.

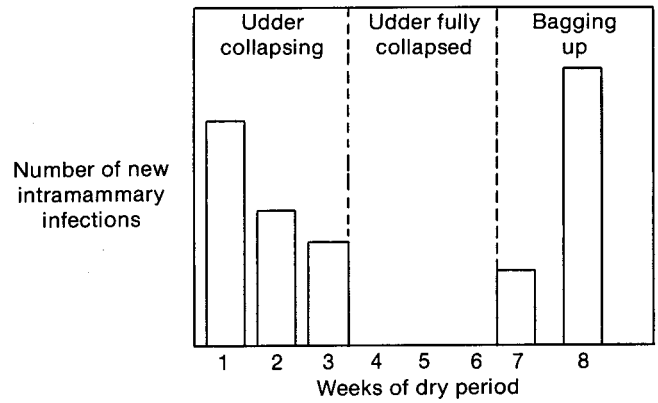


**Figure 1. Incidence of new infections during the dry period**

During the middle of the dry period, when the udder is fully collapsed and the teat canal has been sealed with a keratin plug, the udder is relatively resistant to new infections. Occurrence of new infections during this period is rare.

Another critical time for new infections is during the two to three weeks prior to freshening. This is the period during which new mammary secreting tissue is being formed. Udder edema and increasing intrammary pressure may make it easier for bacteria to penetrate the teat canal. Ohio studies have indicated that the intramammary environment is more conducive to bacterial growth when the cow is bagging up, making the udder vulnerable to new infections.

**Figure 2. This cow had a new infection in the right rear gland during her dry period. She is now fresh and milking. (Photo courtesy of John McDonald, D.V.M., National Animal Disease Center, Ames, Iowa.)**

## CAUSES OF MASTITIS DURING THE DRY PERIOD

*Staphylococcus aureus* and *Streptococcus agalactiae* infections are contagious; they usually are spread between cows during milking. Research conducted during the 1950s indicated that most new infections during the dry period also were caused by *S. aureus* and *S. agalactiae.* In Australia and New Zealand, where pasture systems of management prevail the year around, this is still the observed pattern. Recent research indicates that in the United States, where dairy cattle confinement has become more intense, new infections during the dry period usually are due to environmental pathogens. This does not mean that we should relax our vigil against *S. aureus* or *S. agalactiae,* but that we should consider the problem of environmental mastitis when establishing dry cow management practices.

The shift to a predominance of environmental mastitis during the dry period in this country is easier to understand when we realize that the new infection rate clearly is affected by the bacterial load on the teat. *S. aureus* frequently can be found on the teats after the last milking of the lactation, but rarely can it be found a month after dry off. Coliforms and other environmental pathogens, on the other hand, can be found in large numbers by 21 days after dry off. Numbers of environmental pathogens found on the teats vary greatly, depending on whether cows are exposed to a wet and dirty environment. One study has shown that of the many environmental pathogens, *Streptococcus uberis* appears to be the most prominent cause of dry period infections because of its apparent greater ability to penetrate the teat canal.

## MANAGEMENT STRATEGIES TO PREVENT DRY PERIOD INFECTIONS

### Dry Cow Treatment

The rationale for dry cow treatment came with English research during the 1950s. The treatment was designed to eliminate existing infections of *S. aureus* and *S. agalactiae* at dry off and to prevent establishment of new *S. aureus* and *S. agalactiae* infections early in the dry period. Drug preparations for dry cow treatment traditionally have been formulated against these two infections.

In view of current understanding that environmental pathogens predominate in dry period infection, re-evaluation of current dry cow drug preparations needs consideration. Some dry cow products are reasonably effective against the environmental pathogens as well as against *S. aureus* and *S. agalactiae.* Consulting with your veterinarian is the best way to determine which dry cow product to use on your farm.

As a general recommendation for most herds, it is advisable to dry cow treat all quarters of all cows. There are some exceptions to this rule. Selective dry cow treatment in which cow selection is based on sound criteria (e.g., somatic cell testing) may be a valid approach in herds with minimal mastitis problems.

### Sanitation

The dry cow or the springing heifer should be the cleanest animal on the farm. This idea has not been emphasized nearly enough and is an area that many dairymen neglect entirely. Exercise lots, loafing areas, stalls, and maternity pens for these animals often are wet and dirty. As previously mentioned, numbers of new infections relate directly to the bacteria population on teat ends. Increased udder pressure both early and late in the dry period results in dilation of the teat end and allows relatively easy access to bacterial colonization of the teat canal. Since these udders are unmilked, pathogens are not flushed out during milking. Such contaminated teat canals eventually may lead to new intramammary infections.

Although dry cow treatment can help avoid establishment of new infections during the first three weeks of the dry period, the udder is very vulnerable during the last few weeks of the dry period. Special attention must be given to the bagging cow or springing heifer. These animals must be kept clean and dry if early lactation mastitis is to be avoided.

### Teat Dipping Dry Cows

Teat dipping with antibacterial disinfectants has been tried with limited success during the dry period. The problem is that most lactation teat dips do not persist in adequate concentration to be effective for long periods on the teat surface. Teat dipping dry cows two weeks prior to calving is a good practice for reducing new infections during this vulnerable period.

### Fly Control

Fly control is important in reducing teat contamination during the summer months. Certain mastitis pathogens (e.g., *Corynebacterium pyogenes*) commonly are transmitted by flies. *C. pyogenes* is a common cause of clinical mastitis during the dry period.

### Dry Off Strategy

As previously mentioned, there is a seven-fold increase in the numbers of new infections during the period immediately following dry off. Dry off strategies may have significant impact on this infection rate, especially in high producing cows. Certainly those cows with mastitis (subclinical or clinical) at dry off need special attention. Sound uddered cows can be dried off by the complete stopping of all milking, combined with limiting of feed and water.

In the case of high producing cows, it is advisable to stop feeding grain two weeks prior to anticipated dry off. This will reduce excess intramammary pressure on the udder at dry off.

## SUMMARY

To help prevent dry period mastitis:

1. Culture somatic cell count positive cows at dry off and those positive at freshening to determine what type of mastitis problems predominate.
2. Keep dry cows and springing heifers in a clean, dry environment.
3. Dry cow treat all quarters of all cows in problem herds.
4. Teat dip bagging cows and springing heifers two weeks prior to freshening.
5. Improve fly control.
6. On high producing cows, stop all grain feeding two weeks prior to anticipated dry off.

In most cases, applying dry cow control procedures requires little capital investment. Also, most mastitis control practices are additive. A single control practice by itself will not have as great an impact as when they are all applied together. Consistent application of mastitis control procedures will lower the level of mastitis in your herd and thereby improve profitability.

Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Norman A. Brown, Director of Agricultural Extension Service, University of Minnesota, St. Paul, Minnesota 55108. The University of Minnesota, including the Agricultural Extension Service, is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, creed, color, sex, national origin, or handicap. 5 cents